

PATENT ABSTRACTS OF JAPAN

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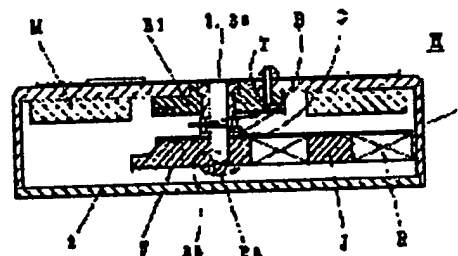
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(54) FIXED SHAFT OSCILLATION MOTOR

(57)Abstract

PROBLEM TO BE SOLVED: To obtain a fixed shaft oscillation motor in which current consumption is reduced while preventing an unnecessarily large air gap from being formed by preventing axial vibration of rotor in starting and rotating thereof and mechanical noise is also reduced in starting and rotating.

SOLUTION: One end 3a of a shaft 3 is secured to a part 1 of a housing H and an eccentric rotor R is pivoted to the other end 3b and urged toward the fixed side using the magnetic force of a field magnet M. The fixed shaft oscillation motor can employ an axial gap type or radial gap type structure.



LEGAL STATUS

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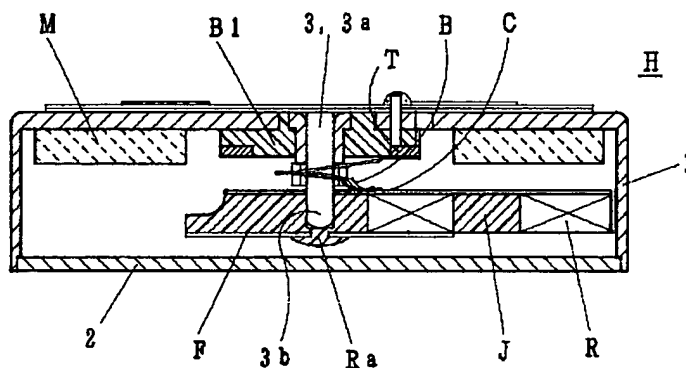
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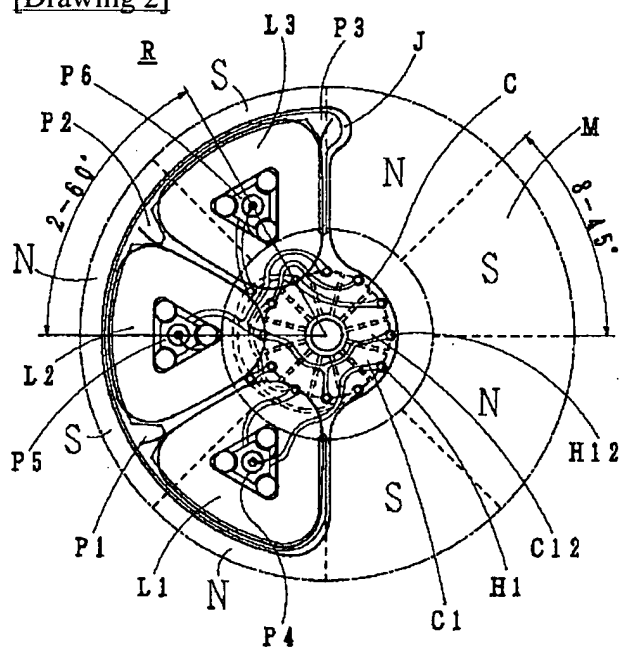
DRAWINGS

[Drawing 1]

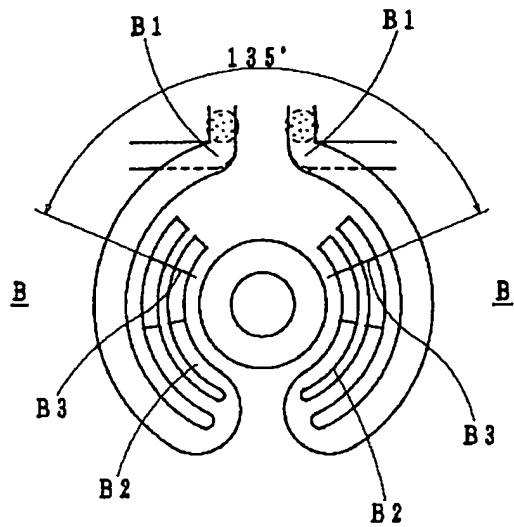
1: ケース
2: ブラケット
R: 偏心させたロータ
Ra: 軸承部
3: 軸
F: 磁性板
M: 界磁マグネット



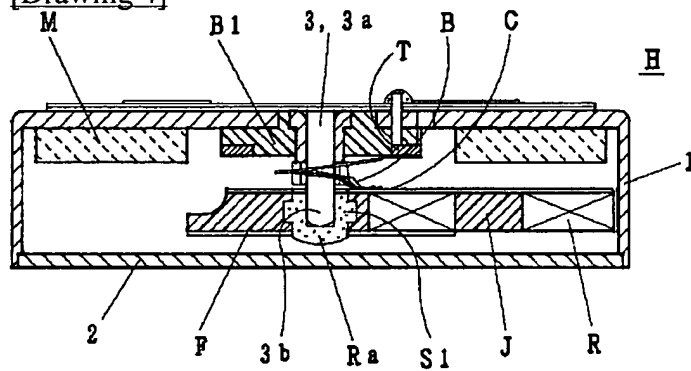
[Drawing 2]



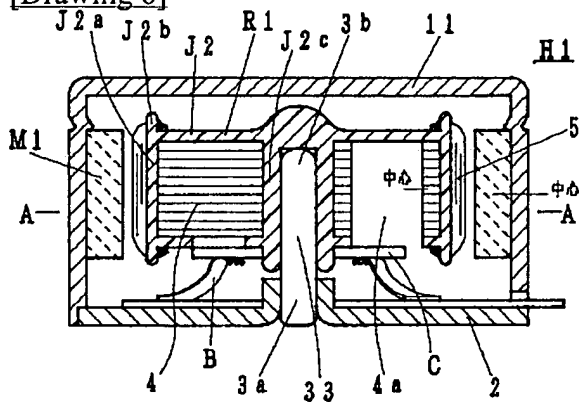
[Drawing 3]



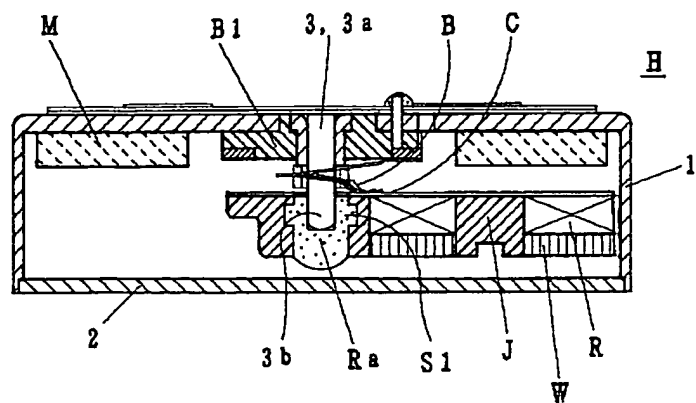
[Drawing 4]



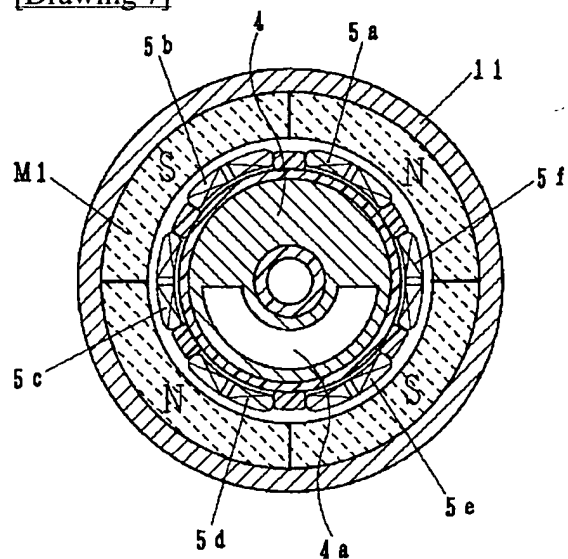
[Drawing 6]



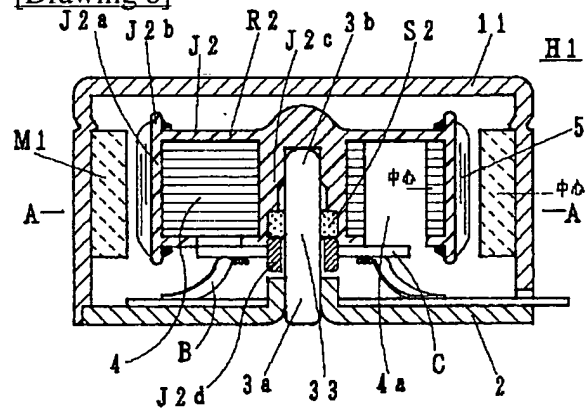
[Drawing 5]



[Drawing 7]



[Drawing 8]



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention is used for silent information means, such as a pocket communication device, and relates to a suitable axial cover-half vibrating motor.

[0002]

[Description of the Prior Art] An efficient small direct-current motor is used as a silent information means of pocket communication devices, such as a pager, and he equips with eccentric weight the revolving shaft projected to the way outside housing, and is trying to obtain vibration using the imbalance of this eccentric weight. In recently, when becoming as vibration was only obtained, since the output shaft was unnecessary, what is made to carry out eccentricity of Rota made to build in, and obtained vibration appeared. (Reference, such as JP,7-85636,B)

[0003] Thus, in order to rotate built-in eccentric Rota, it perceived that it was not necessary to rotate a shaft, and these people have proposed JP,6-81443,B and Japanese Patent Application No. 7-264831 previously as an axial cover-half vibrating motor. That is, as shown in Fig. 1 of JP,6-81443,B, and Fig. 4, the end of a shaft is fixed to one side of housing which consists of a case and a bracket, and it comes to support free [rotation] through the bearing which united with this Rota Rota which carried out eccentricity to this shaft from the open end.

[0004]

[Problem(s) to be Solved by the Invention] The above axial cover-half vibrating motors do not need to pursue the high coaxiality of the bearing comrade who allotted the end face of housing like an axial rotation mold, and are easy to constitute, its mass-production nature is high, and a commercial-scene track record is size. The cell itself is miniaturized, capacity of the latest pocket device decreases, and what has as few the consumed electric current of active parts, such as a vibrating motor carried, as possible is desired. It is in the purpose of this invention improving the above axial cover-half vibrating motors further much more, and enabling it to obtain the low consumed electric current. Other purposes of this invention are to avoid the trouble of the machine noise at the time of starting, or an electric supply means while enabling it to set up an opening few by preventing Bure of the shaft orientations at the time of starting of Rota, and rotation in the case of Rota which has single bearing and which carried out eccentricity.

[0005]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, this invention is attained combining the configuration which lessened the bearing part which bars the turning effort of Rota which carried out eccentricity as much as possible, and the configuration which makes an one direction energize this Rota, is carried out in this way, and is making reduction of brake loss, and Bure of Rota prevent.

[0006]

[Embodiment of the Invention] While this invention carries out pivot bearing of Rota which fixed the end of a shaft to the case or the bracket, was made to make free bearing of the rotation of Rota which

carried out eccentricity to this shaft of, and carried out eccentricity by the other end of said shaft, a fixed side is made to energize it using the magnetism of a field magnet.

[0007] When carrying out to a shaft-orientations opening mold coreless motor flat as one of the concrete gestalten While uniting with the interior of housing the part which ****s two or more air-core armature coils on said shaft at least with the synthetic resin made into sliding nature The thing equipped with an electric supply means for it to be allotted to a way among the field magnet which gives magnetism to Rota which arranged the magnetic plate as a part of means made to energize, and which carried out eccentricity, and this Rota through an opening from shaft orientations, and this field magnet, and to give power to said Rota is good.

[0008] Moreover, in being deflected and allotted to one side so that the coil which has a drive function may not come to an anti-center-of-gravity side, and unifying with synthetic resin as Rota, two or more above-mentioned air-core armature coils are good to make it not form a disk.

[0009] Furthermore, as for the synthetic resin unified as Rota, it is good that the part which contributes to center-of-gravity migration at least is a with a specific gravity of 3.5 or more high-specific-gravity member.

[0010] Said magnetic plate is good to make it constitute so that a core may come inside the path of a shaft for reinforcement of the pivot bearing part of a shaft further again.

[0011] When carrying out as 2nd concrete gestalt on the direction opening mold motor of a path which has a magnetic-circuit member in Rota Rota which allots the armature coil and the eccentric means which the magnetic-circuit member was allotted to the interior of housing, and comes to carry out pivot bearing to said shaft and which carried out eccentricity, It is good to have the field magnet which gives magnetism from a path to this Rota through an opening, and an electric supply means to give power to said Rota, and to make it what shifted the magnetic core of a magnetic-circuit member and a field magnet as said means made to energize.

[0012] The above-mentioned magnetic-circuit member may be made the configuration which made it the slot loess mold, among these allotted the eccentric member to the direction.

[0013] When uniformly energized by the fixed side, the inclination of Rota stops thus, coming out of the constituted axial cover-half vibrating motor, even if it carries out eccentricity of Rota itself while brake loss which bars rotation is reduced, since bearing area decreases by carrying out pivot bearing of eccentric Rota to the edge of a shaft.

[0014]

[The 1st example] Next, the important section sectional view of the flat shaft-orientations opening mold core loess vibrating motor shown in drawing 1 as the 1st example of this invention explains. In this drawing, Housing H consists of brackets 2 attached in opening of the shallow reverse dished case 1 and this case 1, and in the center of this case 1, when end 3a of a shaft 3 presses fit, it is held. Other end 3b of this shaft 3 gives a radius of circle, and is detached with the predetermined dimension from the head-lining section of a bracket 2, it is equipped with Rota R which is high specific gravity and consists of good synthetic resin J of sliding nature and which carried out eccentricity free [rotation], and pivot bearing of it is carried out by other end 3b by the un-penetrated bearing section Ra. Rota R which carried out eccentricity is made to energize it to the fixed side of a shaft in response to the magnetism of the field magnet M arranged on the case 1 of the opposite side, giving [the magnetic plate F which consists of thin silicon steel for shaft-orientations energization is buried in Rota R which carried out eccentricity so that a bore may become inside the path of a shaft, and] a reinforcement function. Moreover, the monotonous commutator C which consists of a printed circuit board was installed, and power is received in the field magnet side of this Rota R by ****ing to the brush B implanted in the brush base B1 through Terminal T in the way among the field magnets M.

[0015] The structure of **** of above-mentioned Rota R which carried out eccentricity is a thing as shown in drawing 2 . Namely, in this drawing, at arrangement pitch 60 degree, make one side deflect Rota R to the monotonous commutator C which consists of a printed circuit board, and it arranges on it the air-core armature coils L1, L2, and L3 which have the bore of the equilateral triangle of three pieces. A field is received from the magnet M of eight poles which really came to fabricate by the sliding nature

resin J which blended and carried out an increase in specific gravity (five or more consistencies) of the tungsten alloy powder to the polyamide, and were made to magnetize with N and a magnetization open angle (45 degrees) equal alternately with S. The above and the monotonous commutator C are the segments C1 and C2 of 12 poles which come to gold-plate the pattern by which printed wiring was carried out with 30-degree open angle.... It consists of C12. SURUHORU H1, H2, and H3 allotted to the periphery of each segment C3, C6, C9, and C12 have connected with segments C1, C4, C7, and C10, and C2, C5, C8 and C11 too hastily with conductor patterns D1, D2, and D3 through H12, respectively. P1, P2, and P3 are patterns which carry out package solder connection of the volume end terminal of each air-core armature coils L1, L2, and L3 among drawing, and P4, P5, and P6 are patterns which connect a terminal at the beginning of a volume. In the inside P4 of these patterns, a conductor pattern D1 is set to P5, and connection of D2 is carried out to D3 and P6, respectively. Said commutator C from shaft orientations ****s by the switchback formula so that, as for slide contact side B-2 which was formed in the shape of radii from end faces B1 and B1 seen from the flat surface as the brushes B and B which **** to such [on the other hand] a commutator C were shown in drawing 3, broke into the bore, and was returned, and B-2, the slide contact sections B3 and B3 may come to the location of 135 degrees (3 times of a magnetic pole). Thus, since eccentricity of constituted Rota R is carried out, it produces a centrifugal force at the time of rotation, and generates vibration outside. Since the specific gravity of resin becomes size, the weight of this Rota R produces a powerful centrifugal force. In addition, a full account is given about the rotation principle which uses such Rota that carried out eccentricity by Japanese Patent Application No. No. 264831 [seven to] which these people have proposed previously, and since it is not the main point of the invention in this application, it omits here. [0016] In addition, although the good synthetic resin of sliding nature itself was used as bearing in the 1st example of the above, as shown in drawing 4 as this deformation, only the part which touches a shaft may be used as the good resin bearing S1 of sliding nature, or it may be made a MEKURA mold oil impregnated sintered bearing, and others may be used as a with a specific gravity of about eight high-specific-gravity nylon member.

[0017] You may install in Rota by making nonmagnetic eccentricity weight W into a reinforcement means what arranged the air-core armature coil on division into equal parts at the whole, or was allotted to one side as shown in drawing 5 as deformation of further others.

[0018] Although drawing 6 was used as the direction opening mold of a path which has a slot loess mold magnetic-circuit member as the 2nd example of this invention, it is important section drawing of longitudinal section, and drawing 7 is the A-A line cutting important section sectional view of drawing 6. In this drawing, housing H1 consists of a bracket 2 attached in opening of the saccate case 11 and this case 11, and press fit maintenance of the end 3a of a shaft 33 is carried out in the center of a bracket 2. Other end 3b of this shaft 33 gives a radius of circle, and is detached with the predetermined dimension from the head-lining section of a case 11, and it is equipped with it when Rota R1 which carried out eccentricity carries out pivot bearing to other end 3b of said shaft 33 through the synthetic resin J2 of sliding nature. In order that the slot loess iron core 4 which comes to laminate silicon steel thin as a magnetic-circuit member may move a center of gravity to one side, this Rota that carried out eccentricity prepares bore 4a of a mold in a center of gravity and the opposite side for a half moon, and is unified with said synthetic resin J2. As for this synthetic resin J2, it comes to unify the coil guide pole section of covering section J2a of an iron core, and an armature winding 5 J2b and bearing J2c, respectively. The aforementioned armature winding 5 consists of six armature coils 5a, 5b, 5c, 5d, 5e, and 5f currently wound so that it moreover might not superimpose on said guide-holes section J2b at division into equal parts. Since Brush B and the monotonous commutator C are equivalent to the 1st example, the explanation is omitted.

[0019] The cylindrical field magnet M1 which consists of rare earth plastics fixes inside said case 11, and is magnetized N and alternately with S by four poles of peripheries of this Rota that carried out eccentricity. In order to make the fixed side (bracket side) of a shaft energize said Rota R1 which carried out eccentricity, the core of the field magnet M1 is intentionally shifted from the core of said magnetic-circuit member to the bracket side.

[0020] Moreover, although what constituted bearing from an above-mentioned example with synthetic resin itself was shown, in order to reduce bearing projected area as this deformation, it is good as for Rota R2 which made the resin bearing part thin, attached the thin sleeve mold sintering bearing S2 in opening, and made the interior hollow as shown in drawing 8. In addition, J2d is a bushing as an oil barrier means which comes to coat a fluorine system solution among drawing. Homogeneity is made to energize Rota R1 and R2 which was performed above and which carried out eccentricity, without inclining to a bracket side in response to the magnetism of the field magnet M1. If it does in this way, because of a slot loess iron core, compared with what has a salient pole (teeth), there is little cogging torque and starting is easy despite KOADO. And since a center of gravity becomes the opposite side for a half moon for bore 4a of a mold, at the time of rotation, a big centrifugal force arises and vibration is generated.

[0021] Moreover, although bore 4a was used in the 2nd example of the above as a means which carries out eccentricity, you may prepare this bore in both sides, and may also embed the high-specific-gravity member made from a tungsten alloy at one bore.

[0022]

[Effect of the Invention] This invention does the following effectiveness so by carrying out with the gestalt which gave [above-mentioned] explanation.

[0023] Since brake loss which bars rotation since the pivot bearing of Rota which carried out eccentricity was made to carry out at the tip (other end) of a shaft and the fixed side was made to energize using the magnetism of a field magnet decreases extremely and it can energize uniformly, Bure of Rota itself stops arising in an axial cover-half vibrating motor. Therefore, if it is made a shaft-orientations opening mold flat coreless motor, even if it can provide smallness, i.e., a super-thin shape, with an opening extremely and makes it the direction opening mold motor of a path, the mechanical noise at the time of starting and rotation can be decreased by it becoming unnecessary to set up an opening greatly superfluously, and losing Rota Bure.

[0024] And with a flat shaft-orientations opening mold coreless motor, by what carried out eccentricity with the air-core armature coil itself, special eccentric weight is needed and structure becomes easy.

[0025] Moreover, since the synthetic resin unified as Rota which carried out eccentricity was used as the high-specific-gravity member, a big centrifugal force can be produced.

[0026] Furthermore, since it serves as reinforcement of the pivot bearing section with a part of means made to energize, a pivot bearing part can be made thin.

[Translation done.]